

AMENDMENT(S) TO THE SPECIFICATION

Please add the following paragraph at page 1, line 3:

CROSS REFERENCE TO RELATED APPLICATION

This is a divisional of U.S. Patent Application Serial Number 10/069,468, filed February 22, 2002 in the name of Jens Svensson entitled APPARATUS FOR PISTON COOLING AND A METHOD FOR PRODUCING A NOZZLE FOR SUCH AN APPARATUS.

Please replace the paragraph beginning at page 1, line 4, with the following rewritten paragraph:

BACKGROUND FIELD OF THE INVENTION

The present ~~application~~ invention relates to an arrangement for cooling a piston in a combustion engine by spraying cooling oil and particularly to the spray nozzle and to a method of forming the nozzle in accordance with the preamble to patent claim 1 and a method according to the preamble to patent claim 6.

Please replace the paragraph beginning at page 2, line 6, with the following rewritten paragraph:

This object is achieved by the ~~features in the characterising part of parent claim 1.~~ The outlet end of the nozzle exhibiting an outlet aperture in the form, as seen in one cross-section, of a curved slit. This produces results in very good flow characteristics by preventing fragmentation of the jet. Instead, the whole jet stays largely concentrated for a long distance, even at high pump pressure, resulting in better cooling oil utilization ~~utilisation~~ in that a larger proportion of the cooling oil reaches the intended part of the piston and can exert there its cooling effect. This is particularly important in the case of engines with long piston strokes entailing long spraying distances, and at high pump outputs at which the jets delivered by nozzles according to the state of the art usually become prematurely fragmented.

Please replace the paragraph beginning at page 3, line 3, with the following rewritten paragraph:

The invention will now be described in more detail on the basis of embodiments and with reference to the attached drawings, in which:

Fig. 1 depicts a cross-section through a combustion engine provided with an arrangement according to the invention,

Fig. 2 depicts an arrangement according to the invention in perspective with enlarged depiction of an outlet according to a first embodiment, ~~and~~

Fig. 3 is similar to Fig. 2 but depicts a second embodiment of the invention-, and

Fig. 4 schematically illustrates elements used in steps in the process of the invention.

Please replace the paragraph beginning at page 5, line 4, with the following rewritten paragraph:

The invention may be varied within the scope of the claims with ~~in that~~ nozzle arrangements which are differently designed and produced ~~are covered by the invention provided that they are covered by the definition in parent claim 1.~~ Thus the pipe section may be of a different design and the nozzle may be produced in a different way, by some other conventional kind of metal processing or forming, although the aforesaid plastic forming process is preferred. The nozzle may also be made as a separate element fastened to the pipe. It is nevertheless essential that the aperture slit be curved, preferably to a U or C shape, which has been found to cause the jet emanating from such a nozzle to stay together for a long distance without becoming fragmented, even at high pump outputs. One explanation of this is that as expansion of the jet is allowed “inwards”, towards the center ~~centre~~ of the curved cross-section, forces acting to broaden the jet are reduced.

Please replace the paragraph beginning at page 5, line 25, with the following rewritten paragraph:

A method for producing a nozzle for spraying cooling oil towards the underside of a piston for a combustion engine, as shown in Fig. 4, involves inserting a mandrel 20 which exhibits a desired cross-section, preferably a substantially U-shaped or C-shaped cross-section, into one end 22 of a

blank 24 consisting of a metal pipe section, which end is intended to become the outlet end of the nozzle. Thereafter the pipe walls are pressed against the mandrel 20 to bring it about, by a plastic forming process, that the nozzle assumes an internal cross-section corresponding to the cross-section of the mandrel, as in Fig. 2. A subsequent stage is the extraction of the mandrel from the pipe section. The result is the formation of two pipe wall portions which respectively constitute the inner and outer delineating walls of the nozzle's outlet aperture. This is followed by any final treatment of the nozzle required for achieving an appropriate finish, e.g. grinding of the nozzle's end surface. In many cases there is no need for any such final process and the nozzle is usable immediately after the plastic forming process.

Please replace the paragraph beginning at page 6, line 6, with the following rewritten paragraph:

The pipe walls are preferably pressed against the mandrel by rolling pressing as at 26.

AMENDMENT TO THE DRAWINGS

New drawing Figure 4 is attached.